In addition to the "high immunity" solution, other interim solutions are currently available to address EMI between GSM telephones and hearing aids. For example, one solution is monitoring the introduction of new digital phones to prevent the introduction of high powered telephones, *i.e.*, 8 W phones.[42] Other solutions include: 1) informing hearing aid users about the possible effects of digital phone operation, and the appropriate ways to reduce the interference;[43] and 2) providing useful guidelines for mobile telephones designed for use with hearing aids.[44]

B. The Petition grossly overstates the "casual interaction" or "accidental exposure" problem.

The Petition and its attached videotape portrays the electromagnetic interaction issue as a bystander problem, *i.e.*, hearing aid wearers will experience interference from a person using a GSM telephone nearby.[45] The National Telecom Agency Denmark, however, concludes from its study that "82% of hearing aids are not disturbed by persons other than the aid

---

compliance with harmonized EMC standards published in the Official Journal of the European Communities.")

[42] New Zealand Study at 17.

[43] New Zealand Study at 17. *See also* 1995 Australian Study at 49.

[44] NAL May 1995 Study at 49; *See also* BT Lab Study at ¶ 5.

[45] Petition at 4.

user using hand portable 2 W telephones....This means that *only in a few cases* will there be interference with hearing aids caused by other persons using GSM telephones."[46]

CTIA recently polled the European GSM service providers, and confirmed that EMI is not a risk to "innocent bystanders" with hearing aids. In response to CTIA's request for information concerning their operating experiences and reports of interference from hearing aid users in their respective markets, CTIA obtained the following responses:

> **DeTeMobil**--a government-owned GSM service provider in Bonn, Germany, serving 1.1 million customers: "To date we have received no reports of interference to hearing aids from our GSM phones."
>
> **Orange**--a GSM service provider in Bristol, England, serving 200,000 customers: "We have subscribers who are hearing aid wearers and are quite pleased with their GSM phones."
>
> **Mobile Telephone Services, Telecom Finland**--a government-owned GSM service provider in Helsinki, Finland, serving 130,000 customers: "We have received less than 20 reports of interference from our GSM phones. Almost all the reports of interference were received during the first year of commercial operation."
>
> **Telenor Mobil**--a government-owned GSM service provider in Oslo, Norway, serving 100,000 customers: "We have received no specific reports of interference to hearing aids from our GSM phones."
>
> **Mannesmann Mobilefunk GmbH**--a GSM service provider in Dusseldorf, Germany, serving 1 million customers: "The reports of interference to hearing

---

[46] Denmark Study at 5. Of course, the power levels in the United States will only be 1 W, not 2 W. *See* Exhibit 1.

> aids caused by GSM phones have been extremely rare."

In addition, Dr. Ole Lauridsen, in his March 26, 1995, letter to Chairman Hundt concerning the mischaracterization of his research by HEAR-IT NOW's parent, the Wireless Communications Council, stated that:

> "[i]n my little country of Denmark, over 250,000 people (4.8% of the population) are currently using GSM telephones on two competitive nationwide networks and not one single complaint has been received by the Danish Telecom inspector from hearing aid users, car owners, hospitals, airports, medical equipment suppliers, consumer protection agencies, etc."[47]

Thus, casual interaction or accidental exposure to GSM phones is not the major problem as the Petition alleges.

C. The Petition fails to put the studies in proper perspective with regard to the power levels associated with European and U.S. digital telephones.

The Petition ignores the fact that the power levels of the GSM phones tested in the studies attached to the Petition are two to eight times more powerful than the phones to be used in the United States. As the Royal National Institute for Deaf People notes, the level of interference experienced by hearing aid users is dependent upon *the power level of the GSM device,* the design of the hearing aid, and the proximity

---

[47] March 26th Letter to Chairman Hundt at 1-2. Attached as Exhibit 6.

of the GSM device to the hearing aid.[48] The Petition provides no evidence that quantifies the level of interference, if any, from phones to be used in the United States. While the European and other studies are relevant as an initial point of reference for EMI management between hearing aids and European digital telephones, they cannot provide the basis for achieving electromagnetic compatibility between U.S. digital telephones and hearing aids.

Ten million customers, in more than 69 countries around the world, will be using GSM by the end of 1995.[49] In view of the rapid growth and acceptance of GSM, it should be obvious that EMI between hearing aids and GSM telephones cannot be as widespread and unmanageable as the Petition alleges.

D. It is unnecessary and unwise to restrain digital technologies while industry develops solutions.

Dr. Lauridsen concludes in his study that digital technologies should not be banned as "unsuitable" as a result of the European experience with GSM. He specifically states,

> TDMA-concepts in cellular system modulation schemes should therefore not be condemned at the forehand as being unsuitable due to the EMC-experience gained from the introduction of GSM....In the very near future, *i.e.*, after January 1, 1996, only equipment that fulfill the EMC-directive may be

---

[48] The Royal National Institute for Deaf People, *Fact Sheet, New Mobile Telephones* (Oct. 1994).

[49] *GSM: 10,000 Customers a Day (And Rising)*, MOBILE COMM. INT'L, June 1995, at 55, 56. *See also* MOBILE COMM. INT'L, June 1995, at 66-79 for a list of GSM networks worldwide in operation.

> brought to market....There is therefore no reason to discard the TDMA-option due to EMC considerations.[50]

VII. Part 68 of the Commission's Rules is not a solution for providing access to wireless telecommunications for the hearing impaired.

The Commission's Rules do not define hearing aid compatibility or provide technical standards with regard to wireless mobile service telephones. Part 68 narrowly defines hearing aid compatibility in terms of t-coil compatibility with wired telephones.[51] As Congress recognized in 1988, the t-coil technical standard[52] and a narrowly defined hearing aid compatibility definition created for the wired telephone industry cannot be used to address hearing aid compatibility within the wireless communications market.[53]

First, mobile service telephones are radio transmitters. Congress, the Commission, and the industry long ago recognized that due to the physical nature of RF interference, operational compatibility is virtually impossible under the Part 68 definition of hearing aid compatibility and the technical standards. Secondly, the wireless telecommunications market consists of a wide array of

---

[50] Lauridsen Study at 11-12.

[51] 47 CFR §§ 68.4, 68.112, and 68.316.

[52] *See* 47 CFR § 68.316.

[53] *See infra*, note 14.

technologies and services offered across a wide range of spectrum.[54]

As the wireless and hearing aid industries have demonstrated, there are more appropriate methods to achieve hearing aid compatibility with wireless digital telephones and to provide access to wireless telecommunications services for the hearing impaired. As discussed above, the Center's Hearing Aid Project, the HATIS device, effective shielding, and lower power levels are just a few examples of how, without any Federal mandate, the affected industries already are providing real solutions to the management of EMI between wireless telephones and hearing aid devices.

Accordingly, in defining access and hearing aid compatibility for wireless devices, a definition based on providing hearing impaired persons access to wireless devices is more appropriate than the constricting definition and standards provided in Part 68.

VIII. A rule making proceeding will slow down competition and delay PCS services to <u>all</u> wireless customers.

Congress and the Commission have determined that the rapid deployment of PCS and other wireless telecommunications technologies, *e.g.*, mobile satellite services, ESMR, is the best way to enhance competition among commercial mobile

---

[54] *See infra* note 23.

services; provide Americans with access to new and competitive services and technologies; stimulate economic development; and create new jobs in the United States.[55] Against this backdrop, licensing PCS in a timely manner has been the Commission's highest priority to bring competition, access, economic development and new jobs to the American people.[56] Consistent with this effort, the Commission declined to impose technical standards, but instead opted to allow market forces determine the most appropriate PCS technologies.[57]

Less than one month ago, the Commission granted 99 licenses for the broadband PCS A and B spectrum blocks. Many of these licensees, and the PCS pioneers, already have

---

[55] *See* H. REP. No. 111, at 254. *See also In the Matter of Implementation of Section 309(j) of the Communications Act - Competitive Bidding, Second Report and Order*, 9 FCC Rcd 2348, 2351-53 (1994); *In the Matter of Amendment of Section 2.106 of the Commission's Rules to Allocate Spectrum at 2 GHz for Use by the Mobile-Satellite Service, Notice of Proposed Rule Making*, 10 FCC Rcd 3230 (1995), ¶ 1.

[56] *FCC Grants 99 Licenses For Broadband Personal Communications Services in Major Trading Areas*, Mimeo No. 54646 (rel. June 23, 1995) ("Our ability to rapidly put PCS licenses in the hands of the service providers is a direct result of the auction process, in combination with streamlined licensing procedures....We are demonstrating this agency's commitment to providing newer and better services for consumers through the introduction of strong new competitors into the market for commercial mobiles services.").

[57] *In the Matter of Amendment of the Commission's Rules to Establish New Personal Communications Services, Second Report and Order*, 8 FCC Rcd 7700, 7755-7756 (1993).

selected their technology, and are in the process of building their networks based upon GSM technology. American Personal Communications, for example, has announced that it will begin GSM-based PCS service in the Baltimore-Washington market before the end of the year.[58]

Because PCS will use digital technology, a rule making proceeding at this late hour to limit or revoke the hearing aid compatibility exemption for wireless devices will substantially delay competition and access to PCS services for all Americans, both hearing and hearing impaired. Since all digital technologies create some interference, removal of the exemption will delay the operation of all PCS systems until the Commission completes the rule making. Such a delay is unconscionable, particularly when alternatives are available in both the short term and long term, and responsible and appropriate industry efforts already are underway to bring hearing aid compatibility to these new technologies.[59]

Simply put, the existing Part 68 hearing aid compatibility requirements do not apply to wireless devices. Thus, any proceeding to remove the hearing aid compatibility

---

[58] *Wireless World: Five Companies Pick GSM For PCS Network*, EDGE, (Mar. 27, 1995).

[59] Were the Commission to commence a rule making proceeding, manufacturers would be forced to await the final FCC rule before completing the design of their PCS devices and bringing them to market.

exemption for wireless devices would have to start with a clean slate. The on-going efforts to develop solutions to EMI would be stalled as the Commission, through a rule making proceeding, catches up with the on-going efforts of the wireless and hearing aid industries. And all the while, both hearing-able and hearing impaired consumers would be denied the benefits of PCS services and competition.

IX. Conclusion

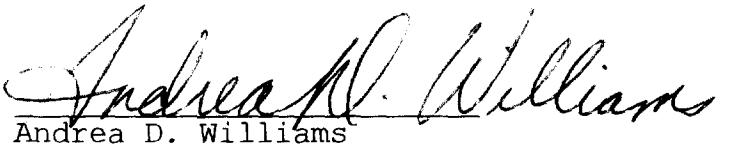
All Americans should have access to wireless telecommunications. The wireless industry is dedicated to achieving that goal for the hearing impaired through both short term and long term actions.

The wireless industry is also committed to the speedy implementation of the newly expanded market created by the Commission. PCS devices are within the meaning of "public mobile service" telephones and therefore are currently exempted from the Commission's hearing aid compatibility requirements, precisely because Congress recognized their potential for interference with hearing aids. The Commission should not initiate a rule making proceeding to limit or revoke the exemption based upon HEAR-IT NOW's mischaracterization of the European and other scientific studies conducted on GSM technology. The Petition provides a myopic view of hearing aid compatibility with digital wireless telephones by focusing on a single RF technology, *i.e.*, GSM.

Not only is the evidence marshaled by HEAR-IT NOW insufficient to support a limitation or revocation of the exemption for all PCS devices, to the contrary, the studies attached to the Petition demonstrate that GSM phones operating at twice the power levels planned for the United States do not impair the rights of the hearing impaired. These and other scientific studies also establish that technical solutions exist to afford the hard of hearing with access to GSM and other digital wireless devices.

For the foregoing reasons, the Commission should deny the HEAR-IT NOW Petition for Rule Making.

Respectfully submitted,



Andrea D. Williams
Staff Counsel

CELLULAR TELECOMMUNICATIONS INDUSTRY ASSOCIATION
1250 Connecticut Avenue, N.W.
Suite 200
Washington, D.C. 20036

Michael F. Altschul
Vice President and
General Counsel

Randall S. Coleman
Vice President,
Regulatory Policy & Law

July 17, 1995

EXHIBIT 1

HANDHELD MOBILE UNITS

	NOMINAL POWER LEVEL	MAXIMUM POWER LEVEL
U.S. AMPS[1]	0.63 W	1.0 W
U.S. TDMA[2]	0.63 W	1.0 W
U.S. GSM[3]	0.63 W	1.0 W
GSM 900[4]	1.25 W	2.0 W

---

1 AMPS is the U.S. analog cellular standard. The AMPS standard is IS-19-B (EIA/TIA 553).

2 TDMA is a digital cellular standard. The U.S. TDMA standard is IS-55.

3 U.S. GSM, or PCS 1900, is a TDMA-based digital PCS standard. The PCS 1900 standard is ANSI J-STD-007.

4 GSM 900 is the European (and world) standard for a TDMA-based digital cellular service. The GSM 900 standard is GSM 05.05 version 4.10.0.

EXHIBIT 2

Building The
Wireless Future

CTIA
Cellular
Telecommunications
Industry Association
1250 Connecticut
Avenue, N.W.
Suite 200
Washington, D.C. 20036
202-785-0081 Telephone
202-785-0721 Fax

Center for the Study of Wireless Electromagnetic Compatibility

GSM Phones & Hearing Aids

The Center for the Study of Electromagnetic Compatibility at the University of Oklahoma was established in early 1994 with seed money from the wireless industry. The Center is developing research on compatibility between hearing aids and wireless telecommunications, as well as other inter-industry electromagnetic compatibility issues.

The academic independence of the Center for the Study of Electromagnetic Compatibility at the University of Oklahoma assures that every industry and business will have equal access to its services and that government agencies will have an independent resource for information and expertise.

The Center serves six major functions:

- Provide testing to assure that electronic devices are properly designed and installed to resist unintended interaction with external electromagnetic sources.
- Host forums to address electromagnetic compatibility issues.
- Perform research to evaluate and resolve electromagnetic compatibility issues.
- Educate consumers and users about electromagnetic compatibility considerations.
- Coordinate the activities of industries and organizations involved in setting electromagnetic compatibility standards.

- more -

- Assist societies and trade organizations to address inter-industry electromagnetic compatibility issues.

The Center is located on the campus of the University of Oklahoma and is managed by the School of Industrial Engineering with a strong research partnership with the School of Electrical Engineering.

The Center also has access to AT&T's 70 acre, multi-million dollar Open Area Test Site (OATS) EMC Lab in Oklahoma City, the premier facility of its kind in the nation.

The Center has an industrial advisory board and a group of founding companies that provided the initial startup funds. Companies may participate in a variety of ways by becoming sponsors of the center and/or users of the services offered by the center. The strategy is to include a variety of companies from the wireless, medical, automotive and aviation industries. One of the Center's first research projects is to analyze cardiac pacemaker and defibrillator compatibility with the wireless technologies proposed for operation in North America. CTIA members stand behind the efforts of the Center, but this is not the only effort underway to address electromagnetic compatibility issues.

###

For Further Information Contact:
Mike Houghton, CTIA Director for News Media Relations 202-736-3207

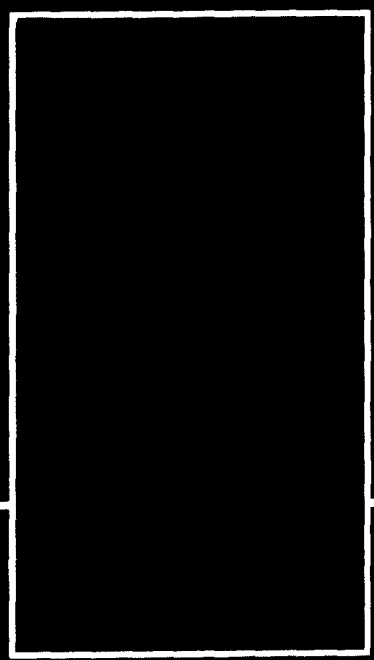
Center

for the

Study of Wireless

Electromagnetic

Compatibility

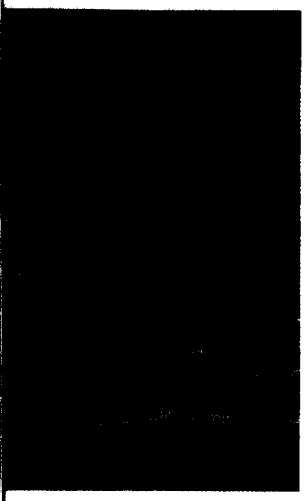


OKLAHOMA

Need for the Center

The growth of the cellular phone industry has been phenomenal. It is expected to continue to accelerate and exceed that of the personal computer industry in the '80s.

Cellular phones, personal communication devices and other wireless products will proliferate as industry and personal users continue to fold these products into their everyday lives. As their numbers increase, there will be more opportunities for these devices to interact in ways that may be difficult to predict. There is a need for an independent center to investigate, study and provide education concerning the use of these devices and their management for effective compatibility with other electronic products. The Center for the Study of Wireless Electromagnetic Compatibility has been created at the University of Oklahoma to address these needs.



EMC Center Research Facility at the University of Oklahoma Sarkeys Energy Center on the Norman campus

Goal of the Center

Our goal is to serve as an independent center dedicated to the investigation of issues related to the electromagnetic compatibility of electronic equipment with wireless devices.

The center will include capabilities to provide education to industry and wireless users, a clearinghouse to monitor the state of the art in trade organizations and standards committees, and research/test facility for products related to the wireless industry.

EMC in aviation

Services of the Center

- Provide EDUCATIONAL SERVICES to users of devices that are concerned with possible interaction with wireless devices.
- Perform or oversee INDUSTRY-DRIVEN RESEARCH.
- Provide for DEVICE INTERACTION TESTING.
- Provide a CLEARINGHOUSE for societies and trade organizations that focus on EMC.
- Serve as a STANDARDS WATCH to provide information to the standards organizations that must consider EMC.
- Host ANNUAL FORUMS to discuss EMC issues and direction.

EMC in health care

Structure of the Center

The center is located on the campus of the University of Oklahoma. It is managed by the School of Industrial Engineering with a strong research partnership with the School of Electrical Engineering.

The center has an industrial advisory board and a group of founding companies that provided the initial startup funds for the center. The advisory board is responsible for the strategic direction of the center. Companies may participate in a variety of ways by becoming sponsors of the center and/or users of the services offered by the center. The strategy is to include a variety of companies from the wireless, medical, automotive and aviation industries.

EMC in automotive

(cut on dotted line)

Contact Information

Center for the Study of Wireless Electromagnetic Compatibility
Hank Grant, Director
School of Industrial Engineering
The University of Oklahoma
202 W. Boyd, Suite 124
Norman, OK 73019-0631

Phone (405) 325-3725
Fax (405) 325-7555

Name _____

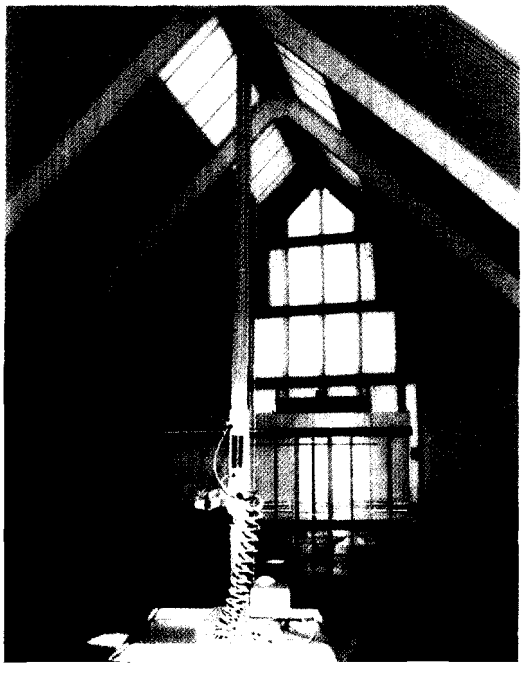
Company _____

Address _____

City _____ State _____ ZIP _____

Phone _____ Fax _____

Please send information ☐ on the center ☐ on company sponsorship.
☐ Please contact us.



Test facility used by the EMC Center, AT&T in Oklahoma City

The University of Oklahoma

The University of Oklahoma is a major, national research university serving the educational, cultural and economic needs of the state, region and nation. Created by the Oklahoma Territorial Legislature in 1890, the university has 20 colleges offering 127 undergraduate degree programs, 129 master's degree programs, 94 doctoral programs, professional degrees in four areas, and 36 dual professional/master's programs.

OU enrolls more than 24,000 students on campuses in Norman, Oklahoma City and Tulsa and has approximately 1,500 full-time faculty members. The university's annual operating budget is $487 million. The University of Oklahoma is an equal opportunity institution. (9-94)

EXHIBIT 3

Joint Review Committee Planning Forum
INTERACTION BETWEEN WIRELESS PHONES
AND HEARING AIDS

Members of the wireless and hearing aid industries held a planning forum on June 6, 1995 in Dallas, Texas, to assist the University of Oklahoma Center for the Study of Wireless Electromagnetic Compatibility in designing the information collection and test systems necessary to address interaction between wireless devices and hearing instruments. Approximately 35 representatives from 15 organizations participated in the forum, including wireless manufacturers and carriers, hearing aid manufacturers and research institutes.

The forum began with a review of the structure and purpose of the OU Center and a discussion about the goals for the wireless/hearing aid interaction evaluation. This discussion was led by Dr. Hank Grant of the EMC Center. Goals identified by the participants included:

-- Characterize the current state of the art
-- Create a plan for linking the hearing aid and wireless industries for the continuing exchange of information
-- Involve the appropriate standards bodies and regulatory agencies
-- Investigate existing standards and identify trends that may affect interaction
-- Provide hearing aid manufacturers and component producers with information on the EMC characteristics of wireless devices
-- Develop a joint industry position quantifying interaction and what can be done to resolve it
-- Conduct testing in phases or tiers so that some information can be available quickly
-- Involve the appropriate consumer advocacy and related industry groups, e.g. audiologists
-- Design "feed back"

The second session of the forum focused on a review of existing research on wireless devices and hearing aid interaction. The panelists included staff members from Ericsson: Lars Goran Larsson, Director of Standards & Regulations; Barry Kratz, Director Business/Industry Relations; and Christer Tornevik, Research Engineer. This session also included an overview of hearing aid regulations and electromagnetic immunity standards. It was agreed that participants should forward studies and relevant materials on this issue to the EMC Center for the purpose of creating a central library of information that could be summarized and made available on the Internet.

Representatives from the hearing aid industry and research organizations presented a panel on the scope and trends of the hearing instruments industry in North America. The panelists, organized by Northern Telecom, included: Dr. Horst Arndt,

Director, Research & Development for Unitron; Dr. Ross Roeser, Director of the Callier Center for Communication Disorders; and Dr. Jacek J. Wojcik, President of APREL Laboratories. This panel reviewed the number of hearing aids in use in the U.S. and the types of hearing instruments being used and developed. Information on RF/hearing aid testing in Canada and the U.S. was also presented.

The final presentation session focused on a review of the test designs used in the existing research. The panelists included representatives from Nokia Mobile Phones: Mikko Pesola, Senior Engineering Manager RF Technology and Chris Wallace, Director Technology Standards and Industry Relations.

Following the formal presentations, representatives from the EMC Center facilitated discussions on the collection and disseminatios of information on the wireless/hearing aid evaluation program and ways to keep stakeholders informed. Adedeji Badiru, Professor at the University of Oklahoma, led the discussion on Information Management. Specifically he addressed the need to create a data protocol, ways to collect and code the data, and maintaining data integrity. Ravi Ravindran, Associate Provost at the EMC Center, led the discussion to define the classes of stakeholders involved, i.e., the design groups, the Center members, and the regulatory and standards bodies.

At the concluding session of the forum, Robert Schlegel, Associate Professor for the EMC Center, led participants in a "brainstorming" session on possible test designs and considerations. Issues discussed included how to evaluate both the RF (objective) and human (subjective) environments, the kinds of technologies and hearing aids to be tested, and possible test variables.

This forum was to assist the EMC Center in its wireless/hearing aid evaluation program. The Center will incorporate information from the forum in its planning process and distribute forum information to the test design group, which will include representatives from the wireless and hearing aid industries, researchers, and the appropriate government agencies.

Joint Review Committee Planning Forum

INTERACTION BETWEEN WIRELESS PHONES AND HEARING AIDS

June 6, 1995 * Dallas, Texas

Horst Arndt, Ph.D.
Director, Research & Development
Unitron Industries Ltd.

Adedeji Badiru
Professor
University of Oklahoma, School of Industrial Engineering

Nils Bojeryd
Manager, Applications, Product Management
Ericsson Radio Systems

Donald Bowen
AT&T Bell Laboratories

John Breaux, Jr.
Director for Health & Safety Policy
CTIA

Robert Deward
Manager, External Affairs
Pacific Telesis

Lauren Fry
Manager for Health & Safety Issues
CTIA

Hank Grant
Director & Southwestern Bell Professor
University of Oklahoma, School of Industrial Engineering

Matti Kattilakoski
PCS Technologies
Nokia Mobile Phones

Kevin Kelley
Vice President, External Affairs
Qualcomm Inc.

Barry Kratz
Director Business/Industry Relations
Ericsson Radio Systems

Lars Goran Larsson
Director of Standards & Regulations
The Ericsson Corporation

Elizabeth Maxfield
Senior Vice President for Industry Affairs
CTIA

Ray Millington
V.P. & Director of Engineering
Motorola

Melvin Munn
Cellular Manager
Peoples Cellular

Douglas Neeley
Sr. Staff Technical Standards Engineer
Ericsson Inc.

Dinesh Pai
Senior Manager - Standards and Regulation
Northern Telecom Inc.

Mikko Pesola
Senior Engineering Manager RF Technology
Nokia Mobile Phones

Shivakumar Raman
Assistant Professor
University of Oklahoma, School of Industrial Engineering

Ravi Ravindran
Associate Provost
University of Oklahoma. School of Industrial Engineering

Michael Ruduski
Engineering Consultant
AT&T Global Products Compliance Lab

Mike Sache
Starkey Laboratories, Inc.

Robert Schlegel
Associate Professor
University of Oklahoma, School of Industrial Engineering

Charles Spann
Regulation Specialist
Northern Telecom

John Stupka
President & CEO
Southwestern Bell Mobile Systems

Christer Tornevik
Research Engineer
Ericsson Radio Systems, R&D

Christopher Wallace
Director, Technology Standards and Industry Relations
Nokia

Andrea Williams
Staff Counsel
CTIA

Jacek Wojcik, P.Eng.
President
APREL Laboratories